which represents pathogenic amounts of the bacterium.[7] A small piece of leftover turkey was tested, but no organisms were isolated. Leftover gravy and other implicated foods were unavailable for testing.

Discussion

The results of this investigation indicate that about 40% of the juvenile detention facility residents and staff became ill between November 18 and 19, 1995, as a result of food eaten on November 18. Because the incubation period was short and diarrhea was the predominant symptom, *C perfringens* or *Bacillus cereus* was initially suspected.[5] Laboratory tests of stool specimens implicated *C perfringens* as the causative agent. Both epidemiologic and environmental investigations incriminated a Thanksgiving holiday lunch. These findings suggest that mishandled turkey and gravy may have been the vehicles for illness,[1,2,5,7] particularly in light of the fact that *C perfringens* outbreaks are usually associated with reheated meat products.

The contaminated food was not definitively identified, however, for several reasons. Laboratory tests failed to find *C perfringens* in the turkey, possibly due to a sampling error. The bacteria may not have been evenly distributed in the large pieces, thus the small sample of turkey collected may not have been contaminated. In addition to the turkey and gravy, there were significant attack rates for people who ate other foods—bread, mashed potatoes—at lunch (see Table 1). Because the residents and staff of the juvenile hall ate the same preset daily meals, the choice of foods was limited. Therefore, a person who ate turkey and gravy probably also ate mashed potatoes and other foods on the plate. This would explain why several foods appeared suspect.

Factors that may have contributed to the growth of *C perfringens* in the turkey and gravy included the inadequate cooking of large pieces of meat, slow cooling, and insufficient reheating. This outbreak may have been prevented if the following precautions had been taken:

- Using a thermometer to check that the turkey had been cooked and reheated (60ºC) and cooled (4ºC) to the optimal temperatures;
- Slicing the turkey into smaller portions, as opposed to piling large pieces in one stock pot, to facilitate rapid and evenly distributed cooling; and
- Cooling the gravy in smaller, shallower pots.

This outbreak illustrates the need for diligent precautions during food preparation, especially when handling foods of animal origin. The report is a reminder of the importance of ongoing food safety programs in institutional settings because of the potential for large outbreaks. It is recommended that food handler training include the prevention of food-borne illness and that such training be given regularly.

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Reactive Arthritis to *Clostridium difficile* in a Child

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REACTIVE ARTHRITIS has been a well-documented consequence of infection with certain enteric pathogens. The leading bacterial triggers are *Salmonella*, *Shigella*, *Yersinia*, and *Campylobacter* species.[1] The number of reports of reactive arthritis occurring following gastrointestinal infection with *Clostridium difficile* has recently increased.[2–4] The first case of reactive arthritis following *C difficile* pseudomembranous colitis was reported in 1976.[5] In the past 20 years, 22 cases of reactive arthritis or Reiter's syndrome associated with *C difficile* have been reported.[2–10] All 22 patients were adults, the youngest being 22 years old.[9] Herein we report the first case of reactive arthritis to *C difficile* in a child and review the literature on adult cases.

Report of a Case

The patient, a 2 1/2-year-old boy, presented to the emergency department because he refused to walk. He had a history of asthma and frequent middle ear infections. Recently he had been treated for recurrent otitis media with a course of amoxicillin for ten days, followed by a ten-day course of the combination of trimethoprim and sulfamethoxazole. Off antibiotics, he then had watery diarrhea and fever for two weeks, prompting two visits to

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a different acute care facility. Stool cultures were negative for enteric pathogens, as was a study for ova and parasites, but *C difficile* toxin had been detected in his stools on those two occasions in the previous week. Over the two-week period, his fever gradually resolved and the frequency and volume of the diarrhea diminished. For the four days preceding this visit, however, he had left knee pain. The pain worsened to the point where he refused to walk, requiring his parents to carry him about the house. The evening of the emergency visit, he also had left shoulder pain and was unable or unwilling to raise his arm above his head.

On examination in the emergency department, the boy was afebrile (36.8°C [98.2°F]) and appeared well, but he was limping and favoring his left leg. The general examination was unremarkable, and the otitis media had resolved. Examination of his joints revealed that he held his left knee in flexion; it was nonerythematous and mildly swollen. Guarding was present, and passive flexion or extension of the knee elicited pain. In all other joints, including his left shoulder, there was full range of motion and no apparent inflammation. The patient was apprehensive when his left shoulder was examined. No rash, penile discharge, or conjunctivitis was present.

Radiographs of the patient's left hip and knee were normal. A complete blood count was obtained, and his hemoglobin level (114 grams per liter [11.4 grams per dl]) and platelet count ([239 $\times$ 10^9 per liter [239,000 per mm^3]) were just below the normal ranges. His leukocyte count was normal (7.6 $\times$ 10^9 per liter [7,600 per mm^3]), but the differential cell count revealed a mild monocytosis (0.14 [14%]). The Westergren erythrocyte sedimentation rate was elevated (49 mm per hour), as was the C-reactive protein level (18 grams per liter [1.8 mg per dl]). A blood culture revealed no growth at five days. A urinalysis and HLA typing were not done.

A regimen of vancomycin hydrochloride, 15 mg per kg of body weight per dose, orally every eight hours, was started for *C difficile* gastroenteritis, and ibuprofen, 15 mg per kg per dose, orally every eight hours, for left knee arthritis. Over the next ten days, the child's diarrhea resolved. His knee pain abated, mobility improved, and no other joint involvement was noted. After three weeks of ibuprofen therapy, his symptoms and abnormal gait resolved.

Discussion

This report documents the first case of reactive arthritis in a child following a diarrheal illness caused by *C difficile*. The case shares several features of *C difficile*-associated arthritis with those previously reported in adults. To date, 22 cases of reactive arthritis or Reiter's syndrome—sterile arthritis, urethritis, and conjunctivitis—have been reported in adults following *C difficile* gastroenteritis.[2-10] The first 17 cases have already been thoroughly reviewed.[7] Since that review article, 5 additional cases have been reported in the world literature.[2-4,6,8] In our patient, similar to adults with this disorder, a lower extremity large joint was involved. In adults the most commonly affected joint was the knee (16 of the 22 patients).[2-10] Several patients showed a migratory pattern of polyarticular arthritis, but a few had monarticular arthritis.[2-10] In the case reported here, the knee was involved and the history suggested that the left shoulder was also transiently inflamed. Of the 22 adults with *C difficile*-related reactive arthritis or Reiter's syndrome, 9 (41%) had shoulder involvement.[2-10] Arthritis of the shoulder is uncommon at presentation in juvenile rheumatoid arthritis,[11] and involvement of this joint at presentation may be a common feature of reactive arthritis due to *C difficile* in childhood.

Reactive arthritis and Reiter's syndrome are considered to be seronegative spondyloarthropathies.[1] Although seronegative spondyloarthropathies are generally more common in males,[1] of 23 cases of *C difficile*-associated arthritis that have now been reported, just more than half (12) of the patients were women.[2-10] Only time, allowing for more cases to be documented, will tell if this trend of affecting women equally is significant or simply a type 1 statistical error due to the low numbers reported. Consistent with the seronegative nature of reactive arthritis, all the patients with *C difficile*-related arthritis were negative for rheumatoid factor and antinuclear antibodies, with the exception of one patient who had an antinuclear antibody titer of 1:40.[2-10] Of the 19 patients in whom the HLA-B27 status was established, 12 (63%) were positive. This coincides with the percentage of HLA-B27–positive patients among those with the more common bacterial causes of reactive arthritis and Reiter's syndrome.[1] Several studies support the hypothesis that increased intestinal permeability in HLA-B27–positive patients may provoke or maintain joint inflammation in spondyloarthropathies (reviewed by Putterman and Rubinow[7]). Certainly, patients who are HLA-B27–positive are at increased risk of having diarrhea-associated arthritis develop.

In many settings, the most common cause of nosocomial diarrhea is *C difficile*.[12] The recent rise in the number of hospital-acquired cases of *C difficile* gastroenteritis can be linked to new generations of broad-spectrum cephalosporins used to fight infections.[13,14] In addition to second- and third-generation cephalosporins, the use of clindamycin is also significantly associated with *C difficile*-induced diarrhea.[15] The use of combinations of antibiotics also substantially increases the risk of *C difficile* colitis.[12] Of the 22 adult patients with *C difficile*-associated arthritis, 10 were on combination antibiotic therapy before the onset of diarrhea.[2-10] Eight patients had been treated with clindamycin, alone or in combination with other antibiotics, and five were receiving cephalosporins.[2-10] Similar to the case reported here, 11 patients received penicillin or a penicillin derivative, either alone or in combination with other antibiotics, before *C difficile* enteritis developed.[2-10] Once *C difficile* is determined to be the causative agent of the diarrhea, all current antibiotics should be discontinued, and a regimen of oral vancomycin or metronidazole should be started. Although most of the arthritis-associated symptoms will resolve within two to four weeks with the use of oral nonsteroidal anti-inflammatory agents, some patients' symptoms may persist for more than a year, and some may require the use of oral or intra-articular corticosteroids (or both).[2-10] In certain pa-

tients, relapsing *C difficile* may precipitate more than one episode of Reiter's syndrome.[10]

When confronted with a case of diarrhea-related reactive arthritis or Reiter's syndrome, physicians need to be aware of the increasing incidence of *C difficile*-associated arthritis. In addition to the more common enteric bacterial infections, enteric parasites have been reported to cause reactive arthritis in adults[16] and children.[17] This pathogen should be added to the list of organisms to be considered in evaluating a case of reactive arthritis in a child. This should prompt physicians not only to evaluate the stools for ova and parasites, but to check for *C difficile* toxin in cases of culture-negative diarrhea associated with arthritis, especially when the patient has received antibiotic therapy before the onset of diarrhea.

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